August 30, 1998

Federal Communications Commission
Authorization and Evaluation Division
7435 Oakland Mills Road Columbia, MD 21046

Attention: Applications Examiner

Applicant: Guardall Limited
Lochend Industrial Estate
Newbridge
Edinburgh, Scotland EH228 8PL

Equipment: QUEST XLR Long Range Microwave/PIR Intrusion Detector

FCC ID: BQJ82NJUPIT

Specification: 47 CFR 2.100043 Class II Permissive Change

Dear Examiner:

The following application for a Class II Permissive Change, is presented on behalf of Guardall Limited for their QUEST - LR/XLR Long Range Microwave/PIR Intrusion Detector. The Quest XLR is similar to the Jupiter model with the following differences: 1) the microwave range is increased by fitting an extension to the existing horn antenna 2) The mirror used for the Passive Infra-Red Detector is of different optical, but similar mechanical design 3)The housing is larger than Jupiter, but of similar appearance 4) 2PCB's are joined via a cable assembly rathar than direct on board connectors.

Enclosed, please find documentation demonstrating that this device complies with the technical requirements of 47 CFR 2.1043 for a Class II Permissive Change.

If you have any questions, please contact the undersigned, who is authorized to act as Agent.

Sincerely,

Chris Harvey

MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*

914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230-3432 • PHONE (410) 354-3300 • FAX (410) 354-3313

ENGINEERING TEST REPORT

in support of the
Application for Class II Permissive Change

EQUIPMENT: QUEST - XLR Long Range Microwave/PIR Intrusion Detector

FCC ID:: BQJ82NJUPIT

Specification: 47 CFR 2.1043

On Behalf of the Applicant: Guardall Limited
Lochend Industrial Estate
Newbridge
Edinburgh, Scotland EH228 8PL

Manufacturer: Guardall Limited
Lochend Industrial Estate
Newbridge
Edinburgh, Scotland EH228 8PL

Manufacturer's Representative Mr. Gary Wilson

Test Date(s): August 4 - August 11, 1998

ENGINEERING STATEMENT

I ATTEST: the measurements shown in this report were made in accordance with the procedures indicated, and that the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements.On the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 2 and 15 of the FCC Rules under normal use and maintenance.

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Kenneth Bass
EMI Engineer, MET Laboratories

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Supervised by:
Chris Harvey Director, EMC Laboratory

1.0 INTRODUCTION

The following data is presented on behalf of the Applicant, Guardall Limited, as verification of the compliance of the Guardall LimitedQuest XLR Long Range Microwave/PIR Intrusion Detector to the requirements of 47CFR2.1043. Graphical data/plots are included as "attachment files" with this electronic application.
Plot1:
Plot2:Measurements of Harmonic Spurs 33-50 GHz
Plot3:Measurements of Harmonic Spurs 50-75Ghz
Plot4:Measurements of Harmonic Spurs 75-110GHz
Plot5: Duty Cycle T_{on}
Plot6: Duty Cycle T_{off}

2.0 TEST SITE

All testing was conducted at MET Laboratories, Inc., 914 West Patapsco Avenue, Baltimore, Maryland 21230-3493. A complete site description is on file with the FCC Laboratory Division as 31040/SIT/MET.

3.0 TEST EQUIPMENT USED

Manufacturer	Equipment	Calibration Due	Cal. Interval
Hewlett Packard	8591E Spectrum Analyzer	1/29/99	annual
EMCO	Biconical Antenna 3104	2/9/99	annual
EMCO	EMCO Log Periodic Antenna	3/20/99	annual
EMCO	Double Ridge Guided Horn	3/20/99	annual
Hewlett Packard	8594EM Analyzer	11/19/98	annual
Solar	LISN	6/30/99	annual

4.0 EQUIPMENT UNDER TEST CONFIGURATION

The Quest XLR was mounted on a non-conductive wood block and table top to monitor transmitted output signal upon power up. The EUT was configured for pulsed operation. Upon supplying the required 12VDC supply voltage , the EUT automatically begins transmission of the pulsed 24GHz signal. During all testing, system components were manipulated within the confines of typical usage to maximize each emission.

5.0 TEST TYPES

5.1 Field Disturbances

5.2 Radiated Emissions

6.0 TEST RESULTS

6.1 TEST TYPE: Field Disturbances

6.1.1 TECHNICAL SPECIFICATION: 15.245

6.1.2 TEST DATE(S): 04 AUG 1998

6.1.3 MEASUREMENT PROCEDURES:

As required by §15.245(a),operation under the provisions of this section is limited to intentional radiators used as field disturbance sensors...(b)The field strength of emissions from intentional radiators operated within this frequency bands shall comply with the following: field strength of fundamental: 2500mV/m, and field strength of 25.0 mV/m for harmonics.

I. The Field Strength/ Output Power

P_o (per 15.245)(b) Limits:

for: f=24.075GHz to 24.175GHz the limit = 2500mV/m @3m = 2500 x 10^{-3} v/m
P_o(lim) EIRP=125mW @ d=3m

P_o(meas)=
-18.83 peak analyzer
+ 2.50 cable/conn. Loss
- 16.3dBm
+34.70 ACF
+18.37dBm corrected @ d=0.3m

$\therefore P_o(w)$=18.37dBm≈ 70mW≈125.37 dbuV/m @ d= 0.3m

So,
EIRP= √30PG/d=4.83V/m=133.68 dBuV/m
P_o=467mW

to correct for distance:

20log d1/d2 =20log 0.3/3=-20dB
26.68dBm-20=6.68dBm@3m=113.68dBuV/m@3m
P_o(d=3m)=$(.4831)^2$/50=4.7mW

II. The Field Strength of Harmonics per 15.245(b):

$P_{o\ (harmonics)}$ = 25mV/m @ d=3m
=.025V/m
$P_{o\ (harmonics)}$ = 87.96dBuV/m @3m

note: corrected to 0.3m by 20log d1/d2=+20dB
$P_{o\ (harmonics)}$ = 107.96 dBuV/m @ 0.3m=d

IIa) $P_{o\ (harmonics)}$ measured = -59.83 dBm@ f = 48.27GHz
+39.00 ACF
-20.83 dBm = +87.83dBuV/m @ 0.3m=d
with peak-avg error correction (refer to 47CFR15.245(4))

Duty fact = $T_{on}/T_{on}+T_{off}$ = 1.0us/16.0us
∴ corr=20log(0.0625) = -24.08dB
∴ $P_{o\ (harmonics)}$ meas= +87.83 - 24.08dB
$P_{o\ (harmonics)}$ (@48.27GHz) = 63.74dBuV @ d=0.3m

IIb) $P_{o\ (harmonics)}$ = -56.50 dbm (noise floor)
+4.01dB ACF
-12.49 dBm = 94.51 dBuV/m = 56uV
$P_{o\ (harmonics)}$ = 56 uW or 94.51dBuV/m @ d= 0.3m

IIc) $P_{o\ (harmonics)}$ = -49.50 dBm (noise floor)
+46.48 dB/m
-3.02dBm = 103.98dBuV
$P_{o\ (harmonics)}$ = 500uW = 103.98dBuV/m@ d=0.3m

6.2 TEST TYPE: Radiated Emissions

6.2.1 TECHNICAL SPECIFICATION: 15.209

6.2.2 TEST DATE(S): 05 AUG 1998

6.2.3 MEASUREMENT PROCEDURES:

Measurements were performed in accordance with the requirements of 47CFR15 and ANSI C63.4. During pre-scan Radiated Emissions tests, there were no emissions detectable at 1.0 meter. The EUT was configured to optimize emissions.
The EUT was not tested on the Open Area Test Site.
The EUT coplies with the limits found in 47CFR15.209.

6.3 TEST TYPE: Restricted Bands

6.3.1 TECHNICAL SPECIFICATION: 15.205(b)

6.3.2 TEST DATE(S): see 6.1 of this report for compliance data

End of electronic report